



# Gordonbush Extension Wind Farm

## Environmental Statement

June 2015

Volume 1: Non-Technical Summary





## Preface

This document forms the Non-Technical Summary (NTS) of the Environmental Statement (ES) for Gordonbush Extension Wind Farm located on Gordonbush Estate, near Brora, in the Highlands of Scotland. The ES accompanies a Section 36 application to the Scottish Ministers for consent under the Electricity Act 1989, and deemed planning permission under the Town and Country Planning (Scotland) Act 1997, section 57 (2), for the construction and operation of a wind farm of up to 56 Megawatt (MW).

The ES comprises the following volumes:

- Volume 1: Non-Technical Summary (NTS);
- Volume 2: Written Statement;
- Volume 3: Figures;
- Volume 3A: SNH Landscape and Visual Wirelines and Photomontages;
- Volume 3B: The Highland Council Landscape and Visual Wirelines and Photomontages; and
- Volume 4: Appendices.

Additional documentation that has been submitted with the section 36 application includes:

- Planning Statement; and
- Cover letter, confirming deposit locations for ES.

The ES documents (NTS, Written Statement, Figures and Technical Appendices) are available for viewing at the following locations:

The Highland Council  
Department of Planning & Development  
Glenurquhart Road  
Inverness  
IV3 5NX  
(open during normal office hours)

The Highland Council  
Area Planning Office  
Drummuie  
Golspie  
KW10 6TA  
(open during normal office hours)

The ES is available for purchase at £1,400 for paper copies and £10 for an electronic version on CD, from:

For the attention of Ruth Liddicoat  
SSE  
10 Henderson Road  
Inverness  
IV1 1 SN  
Tel: 07767 852826 / Email: [Ruth.Liddicoat@sse.com](mailto:Ruth.Liddicoat@sse.com)

Paper copies of the NTS are available free of charge, or an electronic version is available online at [www.sse.com/gordonbushextension](http://www.sse.com/gordonbushextension).

The Application and ES has been advertised in the following newspapers:

- Edinburgh Gazette;
- The Herald; and
- The Northern Times.

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*\* Please note that the visualisation included on the front cover is extracted from ES Figure 7.34: Viewpoint 1 (Beinn Smeorail) and is for illustrative purposes only.*

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# **1 Introduction**

## **1.1 OVERVIEW**

1.1.1 SSE Generation Ltd (SSEG) (the Applicant), holder of a generation licence, is proposing to construct an extension to the operational Gordonbush Wind Farm. Gordonbush Extension Wind Farm (the Development) is located on Gordonbush Estate, approximately 9.5km to the north-west of Brora, Sutherland, as illustrated in Figure 1.1: Site Location.

1.1.2 The total installed capacity of the Development would be up to 56MW. This would comprise of 16 turbines, 13 of which would have a maximum tip height of 130 metres (m), whilst the remaining 3 turbines would have a maximum tip height of 115m.

## **1.2 DEVELOPMENT CONTEXT**

1.2.1 The Development is located to the south-west of Gordonbush Wind Farm, which became operational in June 2012. Gordonbush Wind Farm comprises a total of 35 turbines at a tip height of 110m.

1.2.2 The site boundary, illustrated on Figures 1 and 2, includes the proposed development of wind turbines, new access tracks and associated infrastructure, as well as the existing access track to Gordonbush Wind Farm, the existing substation and borrow pits utilised during its original construction.

1.2.3 Access to the Development would utilise the same delivery route used for Gordonbush Wind Farm, including routes taken for abnormal loads. The route has already been upgraded and it was successfully utilised during the construction of Gordonbush Wind Farm. From the A9 trunk road at Brora, the route would turn west along an unclassified road past the Clynelish Distillery to meet the C6 Strath Brora road. The route would continue along this road to the site entrance at Ascoile.

1.2.4 Other existing infrastructure or work areas from Gordonbush Wind Farm, such as borrow pits, would be utilised where possible or practicable as part of the Development.

## **1.3 THE APPLICANT**

1.3.1 SSE is a British energy company, headquartered in Perth with a team of around 20,000 employees. SSE Renewables Developments (UK) Ltd operate across Great Britain, Ireland and continental Europe, including offshore and onshore wind farms, hydro, marine, biomass and solar projects.

1.3.2 SSE's renewable energy strategy is diverse and complex comprising development of a wide range of renewable technologies. In all, SSE currently has over 3,300MW (SSE Annual Report, 2015) of renewable energy capacity (onshore wind, offshore wind, hydro and dedicated biomass) and pumped storage in operation, under construction or with consent for development in the UK and the Republic of Ireland.

## **2 EIA Process and Methodology**

### **2.1 INTRODUCTION**

- 2.1.1 Environmental Impact Assessment (EIA) is a process that considers how a proposed development will change existing environmental conditions and what the consequences of such changes will be. It therefore informs both the project design and decision making processes.

### **2.2 SCOPING AND CONSULTATION**

- 2.2.1 The EIA Regulations require that an ES should describe the likely significant effects of the Development on the environment. Scoping of potential issues that may be potentially impacted by the Development provides a basis for ensuring that the assessment of environmental effects is focussed on issues of genuine potential significance.
- 2.2.2 In September 2013, a scoping report was sent to Scottish Ministers which identified the potential significant impacts to be addressed in the ES. In December 2013, Scottish Ministers issued their scoping opinion for the Development. This formed the basis for environmental survey and assessment requirements as part of the ES.
- 2.2.3 In addition to the scoping exercise, consultations with statutory and non-statutory consultees, community councils and the local community have continued throughout the assessment process to:
- Ensure that statutory and other bodies with a particular interest in the environment are informed of the Development and provided with an opportunity to comment;
  - Obtain baseline information regarding existing environmental site conditions;
  - Establish key environmental issues and identify potential impacts to be considered in the ES;
  - Identify those issues which are likely to require more detailed study and those that can be justifiably excluded from further assessment;
  - Provide a means of identifying the most appropriate methods of impact assessment; and
  - To proactively engage with the local community, community councils and local councillors.
- 2.2.4 Section 6 of this non-technical summary provides further detail on the scoping and consultation exercise undertaken for the Development.



### **3 Site Selection, Design Evolution and Consideration of Alternatives**

#### **3.1 SITE SELECTION**

- 3.1.1 Gordonbush Wind Farm became operational in June 2012 and is considered to be one of SSE's best performing sites. Apart from an excellent wind resource, the site was considered for extension due to a number of other reasons, including being located within an Area of Search for wind development identified by The Highland Council, its close proximity to transmission network and capacity within the existing substation, as well as good access to the site following upgrades to the local road network during construction of Gordonbush Wind Farm.

#### **3.2 DESIGN EVOLUTION**

- 3.2.1 The design of the Development has evolved through consideration of technical and environmental factors, as well as a series of landscape and visual design principals. Detailed survey information has been compiled into constraints mapping to identify areas of the site that are most and least constrained for development.
- 3.2.2 The design of the Development has evolved through an iterative process and has been subject to six iterations between scoping stage and design freeze are detailed below:
- 3.2.3 At scoping stage, the layout comprised the development of up to 20 turbines, located to maximise energy yield. Turbines were proposed to have a tip height of 132m.
- 3.2.4 During preliminary analysis of survey data it was established that the southern end of the site comprised a number of potentially significant environmental constraints including potential for noise impacts on nearby receptors and potential encroachment into Strath Brora glen. As a result, it was decided that the most southerly wind turbines from the initial layout should be removed from this area of the site, and the total number of turbines was reduced to 16. In addition, to reduce visibility from the glen, the height of the turbines was reduced to a maximum tip height of 130m.
- 3.2.5 Further consideration and analysis of technical and environmental data throughout led to a number of turbines being relocated away from environmental sensitivities found on the site, including pockets of deep peat and areas of highly dependent groundwater dependent terrestrial ecosystems (GWDTEs).
- 3.2.6 Further refinement of the layout from a landscape and visual perspective was undertaken culminating in a number of minor changes. It was found that the three most southerly turbines often appeared prominent in key views, so to benefit the scheme the height of these turbines were reduced to 115m.
- 3.2.7 The design was fixed in January 2015 following its sixth iteration. The total number of turbines at design fix stage was 16. The final layout, as shown in Figure 2, consists of 16 turbines; Turbines 1 to 13 with a maximum tip height of 130m and Turbines 14 to 16 with a maximum tip height of 115m.

## 4 Description of Development

### 4.1 DEVELOPMENT COMPONENTS

4.1.1 The proposed wind farm would include the following key components:

- 16 turbines in total comprising:
  - 13 wind turbines at up to 130m to blade tip height; and
  - 3 wind turbines at up to 115m to blade tip height.
- crane hardstanding area at each turbine location with a maximum area of 1900m<sup>2</sup>;
- one permanent meteorological mast and associated hardstand with a maximum area of 840m<sup>2</sup>;
- an operations building with parking for operational and maintenance staff;
- on site access tracks (of which approximately 7.96km are new access tracks and 11km are existing tracks where upgrades may be undertaken to facilitate delivery of the wind turbine components);
- a network of underground cabling to connect each wind turbine to the existing onsite substation;
- modifications to the existing on site control building and grid substation to accommodate additional cables and equipment; and
- Any associated ancillary works required.

4.1.2 In addition to the above components of the proposed wind farm, the construction phase would comprise the following:

- temporary concrete batching plant;
- temporary telecommunications infrastructure;
- temporary meteorological mast;
- a temporary construction compound and storage area; and
- reopening and extension of two of the original borrow pits developed as part of Gordonbush Wind Farm.

4.1.3 As the Development would be an extension, existing infrastructure from the operational Gordonbush Wind Farm would be utilised where possible. This includes the use of the existing grid substation for the grid connection; existing access tracks and two of the original borrow pits.

4.1.4 Construction access to the site would utilise the same delivery route used for Gordonbush Wind Farm. From the A9 trunk road at Brora, the route would turn west along an unclassified road past the Clynelish Distillery to meet the C6 Strath Brora road. The route would continue along this road to Ascoile.

### 4.2 CONSTRUCTION PROGRAMME

4.2.1 A typical construction period for a wind farm of this size is estimated to be approximately 13 months. The final period would be dependent on weather and ground conditions experienced at the site.

4.2.2 Construction activities are anticipated to be between 07.00 and 19.00 hours Mondays to Fridays, and 07.00 to 14.00 hours on Saturdays between April and September. In winter months (i.e. between October and March), working hours are anticipated to be between 07:30 and 17:00 Mondays to Fridays and 07:30 and 14:00 on Saturdays. No working activities would be planned on Sundays during any period. In the event of work being

required outwith these hours, e.g. abnormal load deliveries, commissioning works or emergency mitigation works, the Planning Authority will be notified prior to these works taking place, wherever possible.

- 4.2.3 Operation of crushing equipment located within / next to borrow pits will generally be limited to 08.00 to 18.00 hours Mondays to Fridays and 08.00 to 13.00 hours Saturdays, with no operation on Sundays.

#### **4.3 CONSULTATIONS WITH THE LOCAL COMMUNITY DURING CONSTRUCTION**

- 4.3.1 Consultation with the local community during the construction of the Development would be an important consideration for the Developer and the successful contractor. At Gordonbush Wind Farm, a community liaison group was set up which provided the local community with information about key construction activities and a mechanism by which concerns from within the local community could be shared and discussed. A similar working group would be established during the construction of the Development.

#### **4.4 ENVIRONMENTAL MANAGEMENT DURING CONSTRUCTION**

- 4.4.1 Prior to construction works, sensitive ecological areas, and other specific sensitive locations (e.g. watercourses) would be marked out as appropriate on site by specialist advisers in order to avoid unnecessary encroachment and protect sensitive areas during construction.
- 4.4.2 A draft Construction Environmental Management Plan (CEMP) has been provided with the ES. The principal objective of this document is to provide information on the proposed infrastructure and to aid in avoiding, minimising and controlling adverse environmental impacts associated with the Development. The CEMP would be updated during the pre-construction phase and would form part of the contract documents between the Applicant and the appointed construction contractor.

#### **4.5 Habitat Management Plan**

- 4.5.1 As part of the Gordonbush Wind Farm development, a Habitat Management Plan (HMP) was designed and implemented to deliver a range of long-term mitigation and enhancement measures on Gordonbush Estate.
- 4.5.2 The overall aim of the HMP is to provide mitigation for any potential adverse effects on the wind farm on golden eagle, merlin and golden plover both by deterring species from the wind farm site ('push' factors) and attracting them elsewhere on the estate ('pull' factors) by enhancement of peatland, woodland and grassland habitats, which are being met via the implementation of a number of methods and specific plans.
- 4.5.3 The Development site boundary overlaps a small part of the HMP area. An Ecological Impact Assessment (EclA) has been undertaken which considered the potential impact of the Development on each of the HMP Objectives. The EclA concluded that none of the HMP Objectives in terms of habitat management and enhancement would be compromised by the Development.

## **5 Planning**

### **5.1 OVERVIEW**

- 5.1.1 The Development would require consent under Section 36 of the Electricity Act 1989, to be determined by the Scottish Ministers. The application for Section 36 consent also seeks deemed planning permission under section 57 (2) of the Town and Country Planning (Scotland) Act 1997 as amended.
- 5.1.2 The Scottish Government influences the planning system through legislation, White Papers, the National Planning Framework, Scottish Planning Policy (SPP), Circulars, Planning Advice Notes (PANs), approval of strategic planning documents and through powers to call in planning applications.
- 5.1.3 The Development Plan system forms the basis on which decisions about development and future land use are made, and effectively incorporates national and strategic policies within a local framework. The Development Plan system has been modernised as a result of the Planning etc. (Scotland) Act 2006.
- 5.1.4 The Highland Wide Local Development Plan (April 2012) and retained sections of the Sutherland Local Plan (June 2010), as well as national policy and guidance, provide the relevant planning policy context against which to assess the Development.
- 5.1.5 A separate Planning Statement, which assesses in detail the Development in the context of the relevant Development Plan policies, national planning and renewable energy policy and other material considerations, has been submitted alongside the ES.

## **6 Scoping and Consultation**

### **6.1 SCOPING**

- 6.1.1 As referred to in Section 2 of this NTS, a scoping report was sent to Scottish Ministers which identified the potential significant impacts to be addressed in the ES. In December 2013, Scottish Ministers issued their scoping opinion for the Development. This formed the basis for environmental survey and assessment requirements as part of the ES.

### **6.2 PRE-APPLICATION CONSULTATION**

- 6.2.1 Following the scoping stage, further consultation with relevant statutory and non-statutory consultees has been undertaken to establish detailed assessment methodology, seek views on the evolving wind farm layout and update on progress of the ES and application submission timescales.

#### **ECDU Gate Check**

- 6.2.2 Prior to submission of the Section 36 application, a gate check report was submitted to the Energy Consents and Deployment Unit (ECDU) and distributed to statutory consultees to confirm comments received during scoping have been addressed in the ES.

- 6.2.3 Further to the gate check, a pre-application meeting was held with ECDU in June 2015.

#### **Public Exhibitions**

- 6.2.4 During October 2013, shortly after the submission of the scoping report, a public exhibition event was held within the local area to allow members of the general public to obtain information and pass comment upon the Development. This exhibition took place on the 30<sup>th</sup> October 2013 at Brora Scout and Guide Hall (12pm to 4pm and 6:30pm to 9pm).

- 6.2.5 A second public exhibition was held during May 2015, to provide information to the community on the final design, key environmental sensitivities identified through the EIA process, timescales for submission and information on the application process. This exhibition took place on the 20<sup>th</sup> May 2015 at [Brora Scout and Guide Hall] [12pm to 4pm and 6pm to 9pm]. All exhibitions were widely advertised in advance in the local press and on local noticeboards.

#### **Community Council Meetings**

- 6.2.6 Throughout the EIA process, regular updates have been provided to Brora, Golspie, Helmsdale and Rogart Community Councils. Representatives from SSE Renewables Developments (UK) Ltd. and the EIA team attended community council meetings in January, February and April 2015 with three of these four community councils to provide an update on the Development. SSE Renewables Developments (UK) Ltd. met with Rogart Community Council in May 2015.

## **7 Landscape and Visual Impact Assessment (LVIA)**

### **7.1 OVERVIEW**

- 7.1.1 The Landscape and Visual Impact Assessment assessed how the Development may affect the physical elements of the landscape; landscape character; areas that have been designated for their scenic or landscape-related qualities; areas of wild land and views from various locations such as settlements, routes, hilltops and other sensitive locations.
- 7.1.2 The potential cumulative effects that may arise from the addition of the Development with other operational, consented and proposed wind farms was also considered.

### **7.2 SITE CONTEXT**

- 7.2.1 The Development site consists of a single slope of moorland, which is surrounded on all sides, other than the west, by higher landform. Loch Brora lies within Strath Brora to the south of the site, where scattered settlement occurs. The operational Gordonbush Wind Farm is located adjacent to the site to the north-east and a 275kV overhead transmission line runs immediately to the west of the site. There are several small forestry blocks on the lower ground around the southern part of the site. Land use tends to be limited to deer grazing and estate management for shooting.

### **7.3 BASELINE CONDITIONS**

#### **Landscape Designations and Wild Land**

- 7.3.1 Landscapes can be ascribed an international, national, regional or local designation that recognises the importance of the landscape for its outstanding scenic interest or attractiveness. These designations include; National Parks, National Scenic Areas (NSA), Special Landscape Areas (SLA) and Gardens and Designed Landscapes (GDL). Eleven such areas were identified within a 35km study area. In addition five Wild Land Areas (WLA), as defined by Scottish Natural Heritage (SNH), were also identified within the overall study area.

#### **Landscape Character Areas**

- 7.3.2 The site lies on the cusp of two landscape character types; sweeping moorland (the western part of the site) and moorland slopes and hills (the eastern part), as defined by SNH. This boundary is not clearly defined and the site as a whole is covered by a transitional landscape that displays characteristics of both types.
- 7.3.3 The study area covers widely varied coastal and interior landscapes of the north-eastern Highlands. The assessment identified 23 Landscape Character Types (LCTs) within the 35km study area, eight of which would most likely have potential to undergo a significant effect as a result of the Development and have therefore been included in the assessment.

#### **Principal Visual Receptors**

- 7.3.4 A number of visual receptors such as settlements and travel routes are considered in the assessment as views that may be affected by the Development.
- 7.3.5 In addition, a series of 17 viewpoints have been identified in order to provide a representative cross section of potential impacts within the study area. These viewpoints

were agreed with The Highland Council and SNH, and include points of specific importance such as recognised viewpoints, designated landscapes, settlements, important routes and attractions. A variety of landscape character types and points from different directions and distances have also been represented.

## **7.4 SUMMARY OF ASSESSMENT AND CONCLUSIONS**

### **Landscape Designations and Wild Land**

- 7.4.1 The assessment findings identified that there will be no significant effects on National Scenic Areas, GDLs, or SLAs other than some parts of the *Loch Fleet, Loch Brora and Glen Loth SLA*. There will also be no significant effects on wild land areas, including the Ben Klibreck - Armine Forest WLA. .

### **Landscape Character**

- 7.4.2 The landscape character types that cover the site and its surroundings are likely to be subject to significant effects up to a maximum distance of around 6.5km, although this would only be the case where there is notable visibility of the Development; extensive areas would gain no or limited visibility.

### **Visual Receptors**

- 7.4.3 The visual assessment has found significant effects on two hilltop viewpoints (Beinn Smeorail and Ben Horn); intermittent significant effects on up to 3km of the minor road from Brora to Rogart travelling eastwards and 1.4km travelling westwards (with potential for an additional several hundred metres if forestry is felled); intermittent significant effects on sections of core paths on the east and west side of Loch Brora; and a significant effect on a part of the access track to Ben Armine Lodge. There would be no significant effects on other routes, including the A9, A836, A839, A897, A949, national cycle routes, long distance walking routes and railway lines.
- 7.4.4 A series of photomontages from key viewpoints (see Table 7.1 below) are included in Figure 3 of this NTS. These are representative views of landscape and visual receptors within the study area.

### **Cumulative Impacts**

- 7.4.5 As well as assessing the effect of the Development itself, the LVIA assesses the cumulative effect that may arise when it is added to operational, consented and application stage wind farms. The cumulative assessment indicates that the addition of the Development to operational and consented wind farms would result in significant cumulative effects on the landscape character of small parts of Strath Brora, including one very small part of the Loch Fleet, Loch Brora and Glen Loth SLA; the minor road from Brora to Rogart, travelling in either direction; and on the view from Creag nam Fiadh. The consideration of application stage wind farms does not lead to any additional significant cumulative effects.

**Table 7.1: Key Viewpoints**

VP No.	Viewpoint Name	Co-ordinates	Reason for Inclusion	Approximate Distance (to nearest turbine in development)
ES Viewpoint 2	Loch Brora (south-west side)	284710, 908389	Viewpoint on the west Loch Brora core path, at a location where the operational wind farm is not visible. Within the Loch Fleet, Loch Brora and Glen Loth SLA.	3.98km
ES Viewpoint 3	Brora to Rogart minor road south of Killin	285892, 905961	Viewpoint to represent the first clear visibility of the Development as gained by westbound travellers on this road. No visibility of the operational Gordonbush Wind Farm. Within the Loch Fleet, Loch Brora and Glen Loth SLA.	6.53km
ES Viewpoint 4	Brora to Rogart minor road north of Killin	285565, 907283	Viewpoint approximately 1.5km west of Viewpoint 3, which illustrates how visibility decreases along the road before ceasing several hundred metres to the west of this viewpoint. No visibility of the operational Gordonbush Wind Farm. Within the Loch Fleet, Loch Brora and Glen Loth SLA.	5.17km
ES Viewpoint 6	Brora to Rogart minor road near Sciberscross	278487, 910447	View gained by eastbound travellers on the minor road, with the operational Gordonbush and Kilbraur Wind Farms clearly visible.	5.86km

## Mitigation

- 7.4.6 The design process for the Development has been fundamental in the mitigation of potential significant effects, with the scoping layout of 20 wind turbines being reduced to the concentrated group of 16 wind turbines that is seen in the final layout. The key effect of this reduction was to pull turbines northwards away from Strath Brora, thus reducing the potential for significant effects to arise within and to the south of the strath. The layout design has also achieved a high level of integration with the operational Gordonbush Wind Farm, and this has been fundamental in the avoidance and reduction of effects on the landscape and visual resource.



## 8 Ecology and Nature Conservation

### 8.1 INTRODUCTION

- 8.1.1 Vegetation and faunal surveys have been undertaken at the site to identify the type, distribution and sensitivity of habitats and species.
- 8.1.2 This included desk and field studies covering Phase 1 Habitat and National Vegetation Classification surveys, as well as searches for mammals, reptiles, fish and freshwater pearl mussel.
- 8.1.3 Environmental assessment work on Gordonbush Estate has been on-going for over a decade as part of the design, development, construction and on-going monitoring of the Gordonbush Wind Farm, which became operational in 2012 following. This information has been drawn upon where relevant during the assessment of habitats and species.

### 8.2 BASELINE CONDITIONS

#### Statutory Site Designations

- 8.2.1 Two statutorily designated sites lie within 5km of the Development; Coir' an Eoin Site of Special Scientific Interest (SSSI) to the west, which is part of the Caithness and Sutherland Peatlands Special Area of Conservation (SAC), and Carrol Rock SSSI on the south-westerly shore of Loch Brora. The River Brora has been identified as a salmonid water. No habitats are hydrologically connected to the adjacent Coir' an Eoin SSSI.

#### Habitat

- 8.2.2 Habitat on site is dominated by blanket bog and wet heath, with lesser amounts of dry heath and wet modified bog, the latter where past drainage has occurred. No nationally Rare or Scarce plant species were recorded, however two plant species of restricted distribution (the moss *Sphagnum fuscum* and Great sundew *Drosera anglica*) were recorded in the blanket bog habitat. Potential areas of Groundwater Dependent Terrestrial Ecosystem (GWDTE) were identified, but subsequent investigation has shown that the majority of this habitat at this site was considered to be sustained by surface rainfall runoff rather than groundwater, with the exception of high GWDTE alongside the two main watercourses (Allt a' Mhuilinn and Allt Smeorail), and a small area to the west of the site.

#### Faunal

- 8.2.3 Five animal species noted on the UK Biodiversity Action Plan were identified in the Development site or its environs including; otter, water vole, bat, Atlantic salmon and brown trout. There were a few signs of otter shelters which were restricted to the two main watercourses just beyond the Development site boundaries, and the lower part of Allt nan Nathraichean in the north-west of the site, with no evidence of holts identified. Evidence of water vole was largely restricted to tributaries on the western and south-eastern site boundaries. No bat roosts were recorded on site, and bat activity was very low, with most bat flights occurring in the tributary valleys and edges of plantation blocks beyond the site boundaries. Pine marten was also recorded in the plantation blocks in the south-east corner of the site, but no dens were recorded. The site was not found to support good reptile habitat and few sightings were made. No evidence of freshwater pearl mussel was recorded on the site or its environs. The only fish species identified in the

streams directly draining the Development site was brown trout. Access to the Development site by migratory fish is prevented by obstacles (waterfalls and a dam) on both the Allt a'Mhuilinn and Allt Smeorail; however, downstream of these obstacles, both streams support populations of Atlantic salmon, brown/sea trout, eels and lampreys.

### **8.3 SUMMARY OF ASSESSMENT AND CONCLUSIONS**

8.3.1 A number of mitigation measures have been proposed to reduce the effects on ecological receptors.

8.3.2 Assessment of effects showed that assuming planned and designed mitigation are fully implemented, residual effects are not significant, except for habitat loss and damage to blanket bog and wet heath habitat which is of minor significance.

#### **Gordonbush Estate Habitat Management Plan**

8.3.3 The Development is located within Upland Management Area 4 of the Gordonbush Estate HMP. Within Area 4, HMP management objectives comprise:

- diversification of sward structure by grazing management; and
- restoration of degraded bog by ditch blocking in the north of Area 4.

8.3.4 Relevant HMP management objectives for land adjacent to the Development can be listed as follows:

- creation of merlin foraging habitat by the felling of the majority of Bullburn Plantation (as compensation for foraging habitat lost to Gordonbush Wind Farm);
- diversification and extension of native woodland by planting and regeneration on slopes in the Mhuilinn and Smeorail valleys; and
- restoration of species-rich grassland by bracken control on the slopes of the Smeorail valley.

8.3.5 These objectives are being undertaken with the aim of enhancing bird habitat for the key species of the Existing HMP, namely golden eagle, golden plover and merlin, plus the secondary species, red grouse and black grouse in Areas 1, 2 and 4. An assessment of the potential impact of the Development on the objectives of the HMP has concluded that whilst the Development will result in a loss of habitat within Area 4, none of the HMP objectives in terms of habitat management and enhancement will be compromised by the Development.

## **9 Hydrology, Hydrogeology and Geology**

### **9.1 INTRODUCTION**

- 9.1.1 The potential effects associated with the construction, operation and decommissioning of the Development on hydrology, hydrogeology and geology have been assessed.

### **9.2 BASELINE CONDITIONS**

- 9.2.1 The Development site and surrounding area can be split into two catchment areas; the Allt a'Mhuilinn catchment, draining the west of the site and Allt Smeorail catchment, draining the east of the site. Both catchments are tributaries of the River Brora to the south, which is an important salmonid fishery and has good overall water quality.
- 9.2.2 The solid geology underlying the site is psammite and micaceous psammite of Kildonan Psammite Formation. This is overlain by isolated peat deposits and Glacial Till over most of the site.
- 9.2.3 Peat depth across the site has been established through a comprehensive programme of probing, which confirmed that over much of the site, the peat thickness is generally less than 1m thick, with pockets of thicker peat (in excess of 2m) confined to local topographical hollows. As part of the design, the disruption of peat has been minimised by aiming to avoid areas of deeper peat deposits, or those areas assessed at risk from peat slide.
- 9.2.4 One licensed surface water abstraction and six private water supplies have been identified within 5km of the Development site, but none of these water supplies are in hydraulic continuity with the site.
- 9.2.5 A number of potential GWDTE were identified within the site boundary. Further detailed assessment has been undertaken which has shown that the majority of the site is sustained by surface rainfall-runoff rather than groundwater, with the exception of areas of high GWDTE along watercourse corridors and an area to the west of the site. The Development has been designed to avoid GWDTE habitats where possible.

### **9.3 SUMMARY OF ASSESSMENT AND CONCLUSIONS**

- 9.3.1 Mitigation measures, based on best practice, are proposed to control the effects on the receiving environment. These measures would be detailed within a Construction Environmental Management Plan to be implemented during the construction of the wind farm. This plan would be produced following consultation and agreement with statutory authorities.
- 9.3.2 With the adoption of proposed mitigation measures, the Development has been assessed as having the potential to give rise to no significant effects.

## **10 Ornithology**

### **10.1 INTRODUCTION**

10.1.1 Birds breeding on the Development site were surveyed in spring 2012 and spring 2013 defined by a buffer of 500m from the site boundary and vantage point surveys were carried out for one year between April 2012 and March 2013. It was not considered necessary to repeat the vantage point survey in 2013/14, as agreed with SNH, since very small numbers of birds were recorded and similar small numbers had been recorded on the adjacent Gordonbush Wind Farm site.

10.1.2 Information gained from survey work carried out previously on Gordonbush Estate has been drawn upon where relevant during the assessment of potential impacts to birds.

### **10.2 BASELINE CONDITIONS**

10.2.1 No bird species listed on Annex 1 of the Birds Directive or on Schedule 1 of the Wildlife and Countryside Act were found to be resident within the survey area and no raptors were found to be breeding within 2km of the site. No qualifying species of the nearby Caithness and Sutherland Peatlands Special Protection Area (SPA) was found to be using the Development site.

10.2.2 As part of Gordonbush Wind Farm an Appropriate Assessment was undertaken, which concluded that golden plover broods were unlikely to cross from the SPA to Gordonbush Wind Farm site. During the 2012/2013 surveys, no golden plovers were recorded foraging on the Development and only one short flight by this species was seen on the site during vantage point observations and it is considered to be an occasional occurrence.

10.2.3 The breeding bird survey recorded 16 resident bird species in 2012 and 10 species in 2013. By far the commonest species in both years was the skylark, with other species occurring in small numbers. All bird species found breeding in the survey area were considered to be of Local or Low conservation value, with the exception of the skylark, which was considered to have a site population of Regional conservation value.

10.2.4 Observations of flight activity were carried out from two vantage points. Low numbers of greylag and pink-footed geese were recorded flying over the collision risk zone (within 253m of the turbines) at risk height (20-150m) and no raptors were detected.

### **10.3 SUMMARY OF ASSESSMENT AND CONCLUSIONS**

10.3.1 There would be no adverse effect on the bird populations or the integrity of the Caithness and Sutherland Peatlands SPA.

10.3.2 Collision risk analysis showed that predicted numbers of collision by both greylag and pink-footed geese were less than 0.001% of the regional populations. As a result, the effect of turbine operation on geese passing over the Development is considered not significant.

10.3.3 No significant effects are predicted on birds through habitat loss, disturbance outside the breeding bird season or collision risk. Potential disturbance of nesting birds if construction is carried out during the bird breeding season (March to July) would be mitigated by appropriate deterrence and nest protection measures. Consequently, it is considered that

there would be no significant residual effects of the Development on birds through habitat loss, disturbance or collision risk.

- 10.3.4 The Development is considered to be very unlikely to have a significant effect on the objectives of the Gordonbush Estate HMP.

## **11 Cultural Heritage**

### **11.1 INTRODUCTION**

- 11.1.1 An assessment on the potential impact of the Development, both direct and indirect, on archaeological or historical sites, areas of known or potential archaeological or historical interest and other features of cultural heritage has been carried out.

### **11.2 BASELINE CONDITIONS**

- 11.2.1 The area has been surveyed previously following work associated with Gordonbush Wind Farm and the upgrade of the Beaulay to Dounreay 275kV overhead transmission line. Additional survey work was carried out for the Development that identified further unrecorded archaeological sites within the search area.
- 11.2.2 The Development extends into a landscape of sparse features of settlement and cultivation dating from the Iron Age to early 19<sup>th</sup> century. The wider area of Strath Brora and the surrounding higher ground contain a number of cultural sites of national importance with statutory protection.

### **11.3 SUMMARY OF ASSESSMENT AND CONCLUSIONS**

- 11.3.1 Of the sites identified within the study area, the Development would have a direct impact on four archaeological features; two field clearance mound, a small cairn and drainage grips, all of local importance. The significance of this impact is considered negligible, although further investigation of the clearance mounds prior to construction works are recommended to recover any environmental and datable evidence.
- 11.3.2 There would be an indirect visual impact at two Scheduled Monuments (SM); Balnacoll Cairn and Duchary Rock Fort. This would take the form of increasing the density and marginally increasing the visible extent of the existing group of turbines. None of the SMs are associated with significant visual relationships with other sites or natural features which would be interrupted by the Development.
- 11.3.3 The indirect impact on all other Sites would be minor or negligible due principally to screening effects from topography.
- 11.3.4 In terms of cumulative impact, the Development would add to the cumulative visual impact at two SMs; Kilbraur Hut Circle and Duchary Rock Fort, as a result of the Development in combination with other wind farm developments. For all other Sites considered in the assessment, the Development would not result in a cumulative impact.

## **12 Access, Traffic and Transport**

### **12.1 INTRODUCTION**

- 12.1.1 An assessment of the effects of the traffic movements, transporting construction staff, construction materials, plant items and turbine components, related to the construction of the Development has been undertaken.
- 12.1.2 Relevant planning policy and guidance has been considered including the Guidelines for Environmental Impact Assessment produced by IEMA (2004), complemented by professional judgement and the experience of trained assessors.

### **12.2 BASELINE CONDITIONS**

- 12.2.1 To determine the baseline conditions a review of the roads hierarchy, a review of traffic count data and a site visit (to visually assess the general nature and condition of the routes around the site) were undertaken to help determine the most suitable route to site.
- 12.2.2 Parts of the local road network were upgraded as part of Gordonbush Wind Farm construction in order to accommodate associated construction and abnormal loads traffic and it is considered appropriate that the same delivery route be utilised for the Development. The likely route to site would therefore follow the A9 trunk road, Clynelish Distillery road and C6 Strath Brora road. Works undertaken on the public road network to accommodate abnormal loads included the opening of the A9/Clynelish Distillery junction at the Old School House, localised strengthening, reinforcement and widening of the Clynelish and Moss roads, widening and straightening works of Gordonbush Bridge and Oldtown Bridge.

### **12.3 SUMMARY OF ASSESSMENT AND CONCLUSIONS**

- 12.3.1 The majority of material would be sourced from borrow pits on site and concrete would also be batched on site, which would significantly reduce transport requirements. No mitigation measures during operation are envisaged as it is predicted that there would only be a very small number of vehicle movements per week for maintenance purposes.
- 12.3.2 Based on existing traffic data, the estimated construction vehicles movements, the assessment concludes that no significant effects are predicted as a result of the construction traffic associated with the Development. However, a number of mitigation measures are also proposed to reduce the adverse effects of the construction traffic including traffic management measures and communications protocols.
- 12.3.3 As referred to in Section 4.3 of this NTS, a community liaison group would be set up to provide the local community with information about key construction activities and a mechanism by which concerns from within the local community could be shared and discussed.
- 12.3.4 A cumulative assessment has also been undertaken which concluded that no significant cumulative effects are predicted on the local roads networks.

## **13 Noise**

### **13.1 INTRODUCTION**

- 13.1.1 A noise assessment of the potential effects from the construction, operational and decommissioning phases of the Development has been carried out.
- 13.1.2 Noise will be emitted by equipment and vehicles used during construction and decommissioning of the wind farm and by the wind turbines during operation. The level of noise emitted by the sources and the distance from those sources to the receiver location are the main factors in determining levels of noise at receptor locations.

### **13.2 BASELINE CONDITIONS**

- 13.2.1 A number of residential properties within the vicinity of the Development have been selected as being representative of the closest located properties to the Development, with the closest of these being approximately 2km from the Development.
- 13.2.2 Noise assessments have been undertaken at these properties by comparing predicted construction and operation noise levels with relevant assessment criteria. In the case of construction noise this is in the form of absolute limit values derived from guidance. For operational noise, limits have been derived from existing background noise levels, as derived from measurements taken at each receptor location and applying the ETSU-R-97 derived noise limits.
- 13.2.3 Predicted noise levels take full account of potential combined effect of noise from the Development along with the operational Gordonbush Wind Farm and operational Kilbraur (and Extension) Wind Farms. Other more distant wind farms were not considered in the assessment as they do not make an acoustically relevant contribution to cumulative noise levels.

### **13.3 SUMMARY OF ASSESSMENT AND CONCLUSIONS**

- 13.3.1 It was concluded that noise generated through construction activities will not have a significant effect, as long as mitigation measures are implemented, including the restriction of working hours (see Section 4.2 of this NTS).
- 13.3.2 Decommissioning noise is likely to result in less noise than during construction and therefore it has been assessed as also not having significant effects.
- 13.3.3 The predicted wind turbine operational noise levels are within the ETSU-R-97 derived noise limits at all receptor locations and for all wind conditions and as such, operational noise impacts are acceptable according to current UK planning policy and are therefore not significant.



## **14 Socio-economics and Tourism**

### **14.1 INTRODUCTION**

- 14.1.1 The potential changes to socio-economic and tourism effects of activity during construction, operation and decommissioning on the local area, in the Highland area and in Scotland were analysed in accordance with regional and national planning policy guidance.
- 14.1.2 The existing socio-economic and tourism conditions were identified through desk-based research and likely effects assessed.

### **14.2 BASELINE CONDITIONS**

- 14.2.1 Demographic data suggests the population of the area is declining which corresponds with a decrease in employment and educational opportunities.
- 14.2.2 Tourism is a key sector and important to the local economy. Popular tourist and recreational activities include walking, cycling, fishing, Clynelish Distillery and Brora Golf Course.
- 14.2.3 The construction of Gordonbush Wind Farm, which became operational in 2012, has delivered real and significant economic and social benefits to the local area. Between 2010 and 2013 tourism related employment in the local area increased by 15% which would suggest that the wind farm has not negatively affected this sector. Further evidence can be seen when considering visitor numbers for attractions close the existing Gordonbush Wind Farm. For example, visitor numbers to Dunrobin Castle increased by 8.5% between 2012 and 2013.

### **14.3 SUMMARY OF ASSESSMENT AND CONCLUSIONS**

- 14.3.1 It was assessed that for the local economy, the scale of the project would be relatively large. The local economy is one of the most sparsely populated areas of Scotland and has a comparatively elderly population. The local economy has a more limited range of employment opportunities than the Highlands as a whole and is highly dependent on employment associated with the decommissioning of the Dounreay Nuclear Plant, which will decrease substantially over the next decade. This suggests that the creation or loss of even a small number of jobs could have a significant effect on the local economy.
- 14.3.2 The projected socio-economic effects of the Development would take the form of a short-term effect during development and construction through employment, spending of employees and purchase of materials and services. It was estimated, based on a 'worst case' scenario<sup>1</sup> that during the construction phase, the Development could support 171 years of employment across Scotland, of which 64 could be in the Highlands. During the operational phase, the Development could support 26 jobs across Scotland, of which 13 could be in the Highlands.
- 14.3.3 The Development is also expected to generate a number of other positive economic effects including community benefit funding equating to a total of £4.6 million over the 25 year operational period of the Development.

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<sup>1</sup> Whilst the Development is anticipated to have a maximum output of up to 56MW, the final turbine selected for the site would be dependent on economics and available technology at the time of construction. The potential socio-economic effects are therefore considered on a 'worst-case scenario', i.e. a turbine with an output capacity of 2.3MW. This enables an assessment of the lowest potential level of investment, based on a potential installed capacity of 36.8 MW.

## **15 Other Issues**

### **15.1 INTRODUCTION**

15.1.1 A number of other issues were assessed within the ES of relevance to the Development that are not covered within the other environmental chapters, namely:

- Telecommunications, Television / Radio;
- Aviation (Civil and Military);
- Shadow Flicker;
- Ice Throw;
- Air Quality; and
- Carbon Balance.

### **15.2 TELECOMMUNICATIONS, TELEVISION / RADIO**

15.2.1 No disruption to telecommunications, television and radio reception are anticipated as a result of the Development

### **15.3 AVIATION (CIVIL AND MILITARY)**

15.3.1 Turbines have the potential to act as obstructions to low flying aircraft and can result in radar clutter being presented on the controlling systems used by air traffic controllers.

15.3.2 An assessment of radar line of sight has shown that the Development is not within line of sight to the HIAL Inverness Airport or RAF Lossiemouth and no effects are anticipated. Furthermore, no technical impacts on operated aviation navigational facilities are anticipated.

15.3.3 The turbine development lies within an area which is deemed a low flying area by the MOD and by aircraft transiting to and from the Tain Air Weapons Range. It is feasible that pilots of low flying aircraft would require visual cues denoting the location of the Development. Therefore, the Applicant will agree a suitable aviation lighting scheme with the MOD.

15.3.4 There are no residual effects on aviation navigational equipment assuming any mitigation agreed with the MOD is implemented. There are no residual effects on aviation operations.

### **15.4 SHADOW FLICKER**

15.4.1 Shadow flicker can arise from the moving shadow of the turbine rotor blade passing over a narrow opening such as the window of a nearby residence. In the UK, only properties within 130 degrees either side of north, relative to the turbines can be affected by shadow flicker, as turbines do not cast shadows on their southern side. As there are no properties within 130 degrees either side of north from the Development, shadow flicker effects would not occur as a result of the Development.

### **15.5 ICE THROW**

15.5.1 The risk of ice throw (ice building up on turbine blades and falling to the ground) resulting in damage or injury is considered to be low. The maximum theoretical distance calculated for ice throw at the Development is 277.5m. The nearest public road and residential property are 2km from the nearest turbine. Appropriate measures are proposed in order to safeguard the safety of operations staff and the public, for example the use of notices at access points alerting members of the public of the possible risk of ice throw under certain weather conditions.

## **15.6 AIR QUALITY**

15.6.1 During the construction of the Development the movement of vehicles and on-site plant would generate exhaust emissions. Given the short term nature of the construction period, and the limited area to be developed within the context of the large-scale nature of the site, effects on local air quality are likely to be negligible.

15.6.2 Construction activities also have the potential to generate dust during dry spells (such as borrow pit quarrying), which may adversely affect local air quality. During construction of Gordonbush Wind Farm, a short stretch of access track close to the entrance from C6 Strath Brora road was tarmacked to minimise dust to adjacent sensitive receptors.

15.6.3 With the implementation of mitigation measures to control dust, no significant effects on air quality are predicted.

## **15.7 CARBON BALANCE**

15.7.1 A carbon assessment has been undertaken for the Development in accordance with Scottish Government recommended methodology 'Calculating Carbon Savings from Wind Farms on Scottish Peatlands – A New Approach' (Nayak *et. al.*, 2010). This methodology has been developed specifically for calculating carbon savings from wind farms on Scottish peat lands.

15.7.2 The potential savings in CO<sub>2</sub> emissions due to the Development replacing other electricity sources over the 25 year lifetime of the wind farm are calculated as approximately:

- 126,564 tonnes of CO<sub>2</sub> per year over coal-fired electricity;
- 63,282 tonnes of CO<sub>2</sub> per year over grid-mix of electricity; or
- 89,331 tonnes of CO<sub>2</sub> per year over a fossil fuel mix of electricity.

15.7.3 The CO<sub>2</sub> 'pay back', which is the period of wind farm operation required until there is a net saving of CO<sub>2</sub> can be calculated as the total CO<sub>2</sub> losses associated with the Development divided by the CO<sub>2</sub> saving per year of wind farm operation. Based on the Scottish Government recommended methodology, the Development has an expected payback time of between 1.3 to 2.6 years (using coal and UK grid supply mix CO<sub>2</sub> emission factors, respectively).

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## FIGURES

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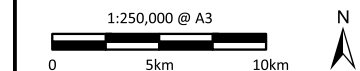




Key:



Site Boundary



1:250,000 @ A3

NTS Figure 1  
Site Location Plan

Gordonbush Extension Wind Farm  
Environmental Statement



# Key:

- Site Boundary
  - ⊕ Proposed Wind Turbine (130m Blade Tip)
  - ⊕ Proposed Wind Turbine (115m Blade Tip)
  - ⊕ Existing Wind Turbine
  - Proposed Permanent Meteorological Mast
- Access Tracks**
- Existing
  - Cut
  - Float
  - + Indicative Passing Places
  - Indicative Hardstanding
  - Proposed Batching Plant
  - Proposed Operations Building and Temporary Construction Compound Area
  - Existing Substation
  - Borrow Pits

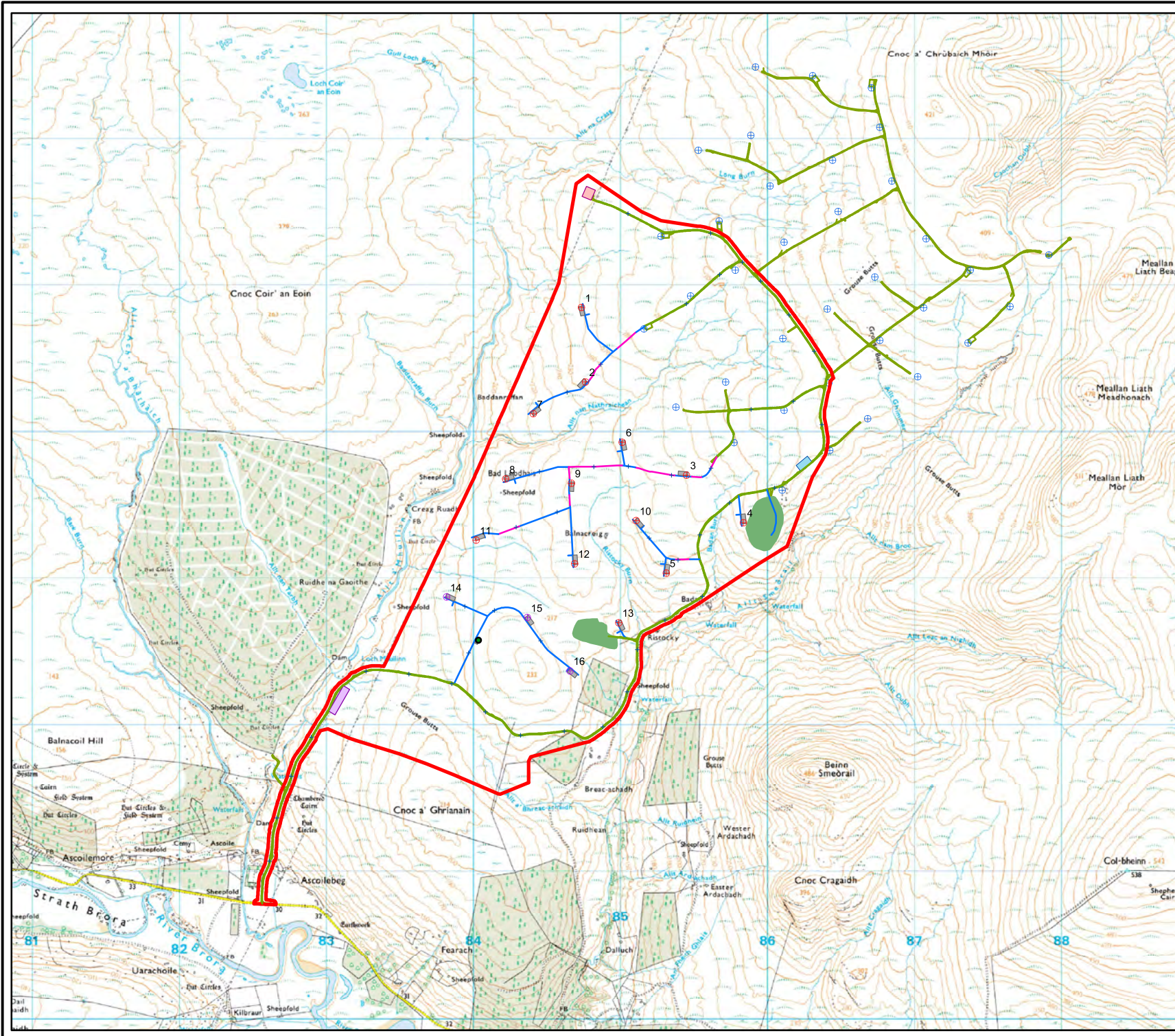
Scale 1:25,000 @ A3

0 0.2 0.4  
Kilometers



NTS Figure 2  
Site Layout Plan

**Gordonbush Extension Wind Farm  
Environmental Statement**







Grid Ref: 284710 908389 Distance to nearest turbine: 3.981km AOD: 30m



Follow core path SU06.02 ('Loch Brora - West Track') from either its eastern end at Doll Bridge or its western end at Kilbraur. If travelling from the western end, the viewpoint is approximately 4km along the path and if travelling from the eastern end, it is approximately 5.2km along the path. The viewpoint is located on the path itself.

THC Viewpoint 2  
Loch Brora (south-west side)

Gordonbush Extension Wind Farm  
Non-Technical Summary





**Viewpoint 2: Loch Brora (south-west side)**

Image to be viewed at a comfortable distance.

Distance to nearest turbine: 3.981km

Camera: EOS 5D II

Focal length: 75mm

Camera height: 1.5m

Date: 23/07/14

Time: 16:28



### Viewpoint 3: Brora to Rogart minor road south of Killin



Grid Ref: 285892 905961

Distance to nearest turbine: 6.526km

AOD: 31m

0 500 1000m  
scale in metres

This viewpoint is located on the minor road from Brora to Rogart, at the southern end of Loch Brora. The viewpoint location is in a passing place approximately 100m to the north of the access/parking area at the northern end of the signposted core path SU06.14 ('Doll Bridge – Loch Brora').

THC Viewpoint 3  
Brora to Rogart minor road  
south of Killin  
  
Gordonbush Extension Wind Farm  
Non-Technical Summary





**Viewpoint 3: Brora to Rogart minor road south of Killin**

Image to be viewed at a comfortable distance.

Distance to nearest turbine: 6.526km    Camera: EOS 5D II    Focal length: 75mm    Camera height: 1.5m    Date: 25/03/15    Time: 14:15



#### Viewpoint 4: Brora to Rogart minor road north of Killin



Grid Ref: 285565 907283 Distance to nearest turbine: 5.167km AOD: 30m



This viewpoint is located on the minor road from Brora to Rogart, approximately 170m north of the property at Killin. The viewpoint location is in a layby/parking area approximately 175m to the north of Killin, and immediately south of the cattle grid.

THC Viewpoint 4  
Brora to Rogart minor road  
north of Killin

Gordonbush Extension Wind Farm  
Non-Technical Summary





**Viewpoint 4: Brora to Rogart minor road north of Killin**

Distance to nearest turbine: 5.167km

Camera: EOS 5D II

Focal length: 75mm

Camera height: 1.5m

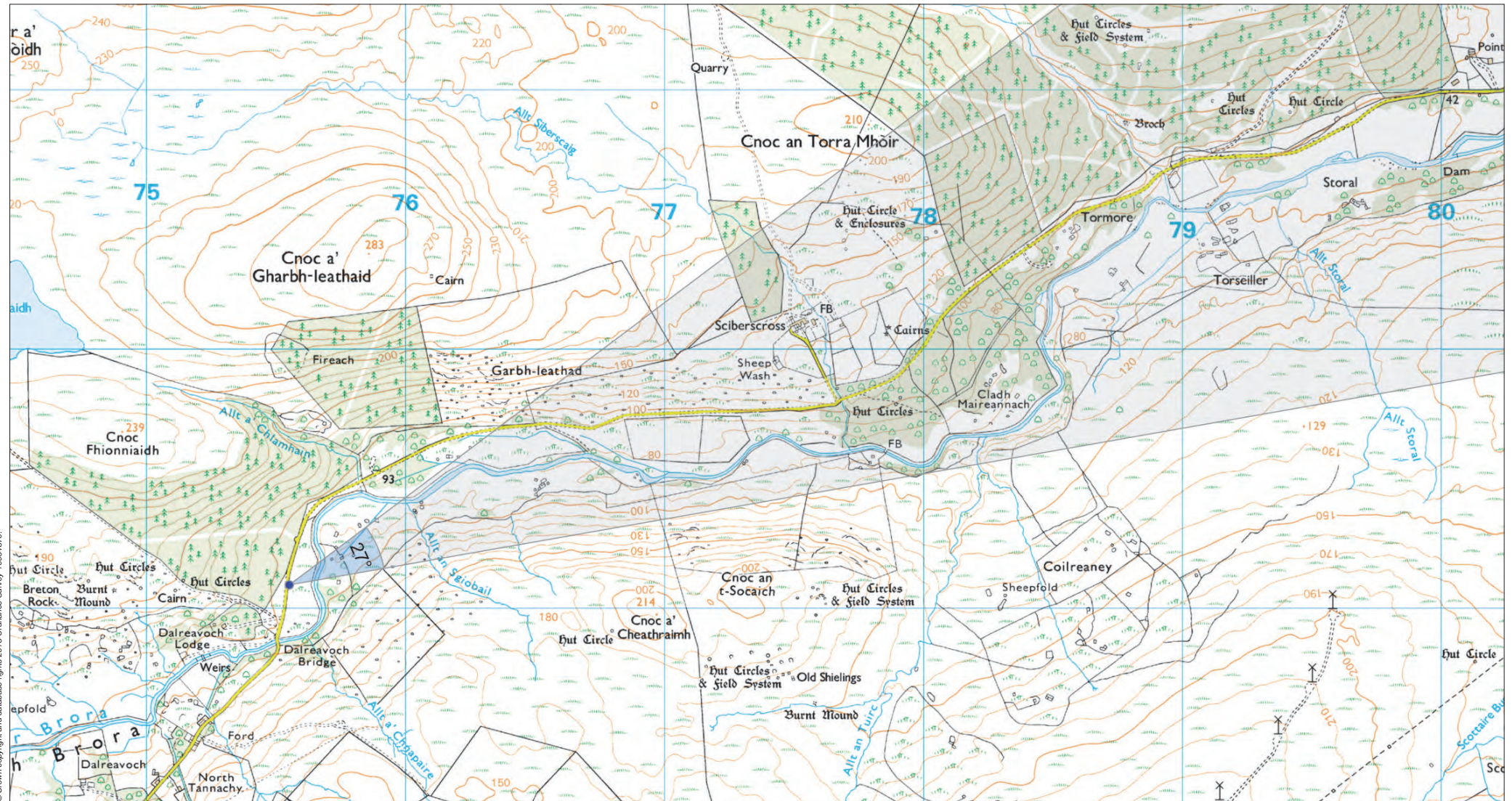
Date: 23/07/14

Time: 12:29

Image to be viewed at a comfortable distance.



## Viewpoint 6: Brora to Rogart minor road near Sciberscross



Grid Ref: 278487 910447

Distance to nearest turbine: 5.858km

AOD: 86m

0 500 1000m  
scale in metres

This viewpoint is located on the minor road from Brora to Rogart, approximately 1km east of the turn-off to Sciberscross. The viewpoint location is on the grass verge on the southern side of the road, approximately 30m to the west of a passing place.

THC Viewpoint 6  
Brora to Rogart minor road  
near Sciberscross

Gordonbush Extension Wind Farm  
Non-Technical Summary





**Viewpoint 6: Brora to Rogart minor road near Sciberscros**

Distance to nearest turbine: 5.858km

Camera: EOS 5D II

Focal length: 75mm

Camera height: 1.5m

Date: 23/07/14

Time: 18:58

Image to be viewed at a comfortable distance.